For permission to download Iowa Lakes Community College embargoed materials from skills commons, contact Robert Leifeld, Vice President of Administration, at rleifeld@iowalakes.edu, or 712-362-0439.

Iowa Lakes Community College is committed to ensuring that all programs and services, including electronic and our website (www.iowalakes.edu), are accessible to people with disabilities. In accordance with the provisions of Sections 504 and 508 of the Rehabilitation Act and the Americans with Disabilities Act (ADA), Iowa Lakes provides students, faculty, staff, and visitors with reasonable accommodations to ensure equal access to the programs and activities of the college. For more information visit: https://www.iowalakes.edu/educational-counseling-services/accommodations-disability-resources.

Mike Gengler is Wind Energy and Turbine Technology Program Coordinator at Iowa Lakes Community College.

Updated in 2017, this course covers an introduction to electrical theory offered in credit programs in a face-to-face format.

**Course Syllabus Fall 2017**

# *Basic Electrical Theory I*

ELE-119-100

Iowa Lakes Community College
300 South 18th Street
Estherville, IA 51334

**Instructor Name**: Michael J Gengler
**Office No**: 306
**Phone**: 712-362-7950
**Email**: mgengler@iowalakes.edu
**Office Hours:** As posted on office door

**Catalog Description**: Electrical Theory I is an introduction to basic electrical theory and components that make up electrical circuits. Direct Current and Alternating Current will be introduced and basic laws for voltage, current and power relationships will be presented in lecture and laboratory format. Course content will include, but not be limited to basic circuits, electrical components and their applications. Hands-on reinforcement of theory covered during lecture is practiced in lab.

*This workforce solution is funded in part by the IHUM Consortium which is 100% financed through a $15,000,000 grant from the U.S. Department of Labor's Employment & Training Administration.*

**Prerequisites**: None

**Credits**: 4 (3 hours of lecture, 2 hours of lab)

**Text & Additional Materials**: Required text: Grob's Basic Electronics (12th Edition); Problems Manual for Grob's Basic Electronics; Multi-meter.

Laboratory will be conducted with additional materials as determined by instructor.

**Course Objectives**: To provide the student with basic knowledge of electrical theory, basic components and their function in electrical circuits as well as the analysis of direct current electrical circuits. After completing the course, a student is expected to be able to:

1. Properly operate testing equipment
2. Define structure of an atom
3. Define Potential, Current, resistance
4. Define characteristics of a closed circuit
5. Describe different types of resistors
6. Interpret the resistor color code
7. Understand and use Multi-meters
8. Define Ohm's law
9. Calculate voltage, current or resistance in a circuit using Ohm's law
10. Explain the difference between an "open" and "closed" circuit
11. Explain the characteristics of a series circuit
12. Calculate voltage, resistance, current and power in a series circuit (Troubleshooting)
13. Define Kirchoff's voltage law
14. Explain the characteristics of parallel circuit
15. Calculate voltage, resistance, current and power in a parallel circuit (Troubleshooting)
16. Define Kirchoff's current law
17. Explain characteristics of a series-parallel circuit
18. Calculate voltage, resistance, current and power in a series-parallel circuit
19. Define the characteristics of batteries
20. Explain the differences of Alternating Current
21. Describe how to generate AC power
22. Explain Non-Sinusoidal Sine waves
23. Describe Faraday's law of induced voltage
24. Define magnetic induction
25. Understand resistance in AC Circuits

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26. Understand and use AC test equipment
27. Define Reactance
28. Define RC Circuits (Series/Parallel) and Troubleshooting

**Course Schedule (Units of Instruction)**:

- Introduction to Powers of 10
- Snap-on multi-meter training
- Introduction to Electricity
- Current flow, Resistors,
- Ohm's Law
- Series circuits
- Parallel circuits
- Combination circuits
- Voltage and Current Dividers
- Kirchhoff's Law
- Network Theorems
- Conductors and Insulators
- Batteries
- Intro to Alternating Current
- Capacitance
- Final

**Methods of Instruction**: Course will be covered by three hours per week of lecture and discussion based on completing assignments, possible site visits, guest speakers and other methods to be determined by instructor. Also, there will be two hours of laboratory work per week that will consist of demonstrations, experiments, search and other tasks that may be required by instructor.

**Grading Scheme**: Grading is determined by total points earned for the semester. The tentative point assignment is as shown below, but is subject to revision.

- Exams (50-100 points) / Quizzes (10-50 points), points vary
- Homework Assignments, points vary
- Class participation (34 lectures @ 2.5 points), 85 points
- Lab participation (17 Labs @ 5 points), 85 points
- Final Exam, 100 points
- Lab works, 300 points

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Total: Approximately 1,000 points

**Grade Scale**:

**A** = 90% to 100%
**B** = 80% to 89.999%
**C** = 70% to 79.999%
**D** = 60% to 69.999%
**F** = Less than 60%

**Other Expectations**: Students are expected to attend all classes and labs. Students unable to attend a lecture or exam must notify the instructor by e-mail before the absence. Students who are absent and have notified the instructor will be allowed to reschedule tests or assignment. Students who are absent and have not notified the instructor will not receive credit on any test or assignment due that day. Students are responsible for learning the course material covered during their absence. The instructor will not notify students individually if assignments or deadlines are missed. Each exam will be announced at least one classes in advance. Students who leave the room while a test is in progress must submit their exam as completed. The final is comprehensive and will be administered during finals week. Students must have achieved a grade of "D" or higher to be eligible for the final exam. Students are expected to conduct themselves in a professional manner. Classes and labs will start promptly. If you are unprepared do not enter the classroom. All communications must be conducted through the iowalakes.edu e-mail address. Any behavior which is disruptive or unsafe may be grounds for removal from class. Cell phone use and texting are prohibited in lecture. Cell phone use and texting are prohibited in lab, unless instructed otherwise. The use of a cell phone will result in a zero for anything done on that day. Only one warning will be given. Students who need to leave class early should let the instructor know before class begins and leave quietly. Avoid prolonged noise, especially during class discussions. Incompletes are only issued when the student can establish a completion date. Drug and alcohol use is prohibited. Students suspected of being under the influence of drugs or alcohol will be asked to leave.
**Important:** NO food or drinks in the lab.

**Students must abide by all policies as stated in the Iowa Lakes Community College Student Handbook.**

Students should be aware that classes might be audio or video recorded by one or more students. The college's policies governing the audio or video recording of class are included in the Student Handbook. Students who have

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any questions or concerns about class recordings should address their questions or concerns with the instructor at the ***beginning of the semester***.

**STUDENT ACADEMIC HONESTY POLICY**

Iowa Lakes Community College believes that personal integrity and academic honesty are fundamental to scholarship. Iowa Lakes strives to create an environment where the dignity of each person is recognized and an atmosphere of mutual trust exists between instructors and students. The faculty has confidence in the integrity of the students and encourages students to exercise good judgment in fulfilling this responsibility.

Actions contrary to academic integrity will not be tolerated. Activities that have the effect or intention of interfering with learning or fair evaluation of a student's work or performance are considered a breach of academic integrity. Examples of such unacceptable activities include, but are not limited to:

- **Cheating** (intentionally using or attempting to use unauthorized material, assistance or study aids in my academic work). For example, using a cheat sheet for a test, looking at another student's paper during an exam, stealing or buying all or parts of an exam or paper, altering and resubmitting work for a better grade without prior approval to do so, etc.
- **Plagiarism** (representing another's ideas, words, expressions or data in writing or presentation without giving proper credit, failing to cite a reference or failing to use proper documentation, using works of another gained over the Internet and submitted as one's own work).
- **Falsification and/or misrepresentation of data** (submitting contrived or made-up information in any academic exercise). For example, making up data, citing non-existent sources, etc.
- **Facilitating Academic Dishonesty** (knowingly helping or attempting to help another violate any provision of the academic honesty policy). For example, working together on a take-home exam or other assignment when the option has not been made available, giving a paper/assignment to another student for his/her use, etc.
- **Multiple Submissions** (submitting, without prior approval from the instructor involved, any work submitted to fulfill academic requirements in another class). For example, submitting the same paper for two different classes, etc.
- **Unfair Advantage** (trying to gain unauthorized advantage over fellow students). For example, gaining or facilitating unauthorized access to exam materials (past or present); interfering with another student's efforts in an academic exercise; lying about the need for an extension on a paper or assignment; destroying, hiding, removing or keeping library materials, etc.

Disciplinary Action

Any violation of this policy will be treated as a serious matter. The instructor has primary responsibility over classroom behavior and maintaining academic integrity. Students who earn an "F" based on any violation of the Student Academic Honesty Policy may not withdraw from the class (and receive a grade of W). Depending on the nature and severity of the offense, Iowa Lakes Community College reserves the right to exercise disciplinary action as outlined in the Disciplinary Action Section of the Student Handbook.

## Americans with Disabilities Act – Policy of Nondiscrimination

It is Iowa Lakes Community College policy to not discriminate against qualified individuals with disabilities and to provide reasonable accommodation(s), as required by law, to otherwise qualified applicants for admission or to students with disabilities in all education programs, activities, services and practices, including application procedures, admissions, course selection, the

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awarding of degrees, discipline and dismissal. Educational opportunities will not be denied to an otherwise qualified application or student because of the need to make reasonable accommodation(s) or modification(s) for the physical and mental impairment(s) of any such individual.

Iowa Lakes Community College students needing reasonable accommodation(s) and/or modification(s) should contact Jody Condon by phone at (712) 852-5219 or via email at jcondon@iowalakes.edu. To assure that accommodation(s) and/or modification(s) will be ready when classes start, students must make the request as soon as possible, before a semester begins.

It is the policy of Iowa Lakes Community College not to discriminate on the basis of sex, race, national origin, creed, age, marital status or disability in its education programs, activities, or employment policies, as required by Titles VI and VII of the 1964 Civil Rights Act, Title IX of the 1972 Educational Amendments, Section 504 of the Federal Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act (ADA) of 1990.

Inquiries regarding compliance with Title IX, Title VI, Title VII, or Section 504 may be directed to Kathy Muller, Human Resources, Iowa Lakes Community College, 19 S. Seventh Street, Estherville, IA 51334, telephone (712) 362-0433; to the Director of the Iowa Civil Rights Commission, Des Moines; or to the Director of the Region VII Office of Civil Rights, Department of Education, Kansas City, Missouri.

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